

ABSTRACT

An injection mold for manufacturing two-component elongated members, particularly toothbrushes, includes first and second mold cavity members which are mounted for relative movement toward and away from one another to open and close the mold, respectively. These cavity members are designed to have at least a portion of each of them extend through an open central frame which carries a rotatable central mold plate in it. The central mold plate is configured to engage parts of the first and second mold cavity members, which do not directly engage one another through the opening in the frame. In the operation of the mold, a pre-form is formed on one side, between the first and second mold cavity members extending through the frame, and between one of those mold cavity members and the rotatable mold plate. When the mold is opened, the rotatable mold plate in the central frame member is rotated 180° to place the pre-form on the opposite side of the mold. The mold then is closed, and the second component is injected in the opposite side of the mold. After a new injection cycle has been completed, the pre-form is simultaneously formed on the first side of the mold and the finished product is formed on the other. The mold again is opened. The central frame moves one-half the distance between the first and second mold cavity members; and the rotatable mold plate is rotated 180° in each cycle. The finished product is ejected, so that a new pre-form can be molded, as described above.

suitable configuration used for two-component molding of products.
Such a machine typically includes a control panel 12 for controlling its operation. In addition, plastic material for injection into the mold cavities and the mold plates is supplied through a pair of injection rams (one for each of the two different components to be molded), one of which 14 is illustrated in Figure 1.

In Figures 1, 2 and 3, the details of the standard mold blocks, including the manifolds, plastic delivery system, cooling lines and the like, have been removed to show a diagrammatic arrangement of the mold [plates] or mold cavity [plates] used in a preferred embodiment of the invention for molding toothbrush bodies. To accomplish this, a fixed mold block 18, carrying mold plates 18A and 18B for two separate manifold systems is provided. The mold plate 18A is injected with the first material for a toothbrush pre-form; whereas the second plate 18B includes a manifold for injection molding the second material to form a two-component toothbrush handle. Figures 4 and 10 illustrate these different plate portions 18A and 18B most clearly; although they are diagrammatically indicated in Figure 3B also.

In conjunction with the fixed mold block 18, there is a movable mold block 16, again mounted on conventional apparatus in an injection molding machine for movement toward and away from the mold block 18 to close and open the mold, respectively. The mold which is illustrated is a straight pull mold, which slides on four pairs of guide pins located, respectively, at the two lower corners